



KAPREALIAN ENGINEERING, INC.
Consulting Engineers

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December 10, 1990

Mr. Dennis J. Byrne
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

RE: Unocal Service Station #3538
411 W. MacArthur Blvd.
Oakland, California

Dear Mr. Byrne:

This letter is submitted in response to your letter dated December 5, 1990, to Mr. Rick Sisk of Unocal Corporation.

Per your request, enclosed please find Kaprealian Engineering, Inc's. proposal KEI-P89-0703.P2 dated October 23, 1989 for the referenced site, as well as Boring Logs and Well Completion Diagrams for wells MW1 through MW4.

Should you have any questions regarding this matter, please do not hesitate to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Mardo Kaprealian
President

MK:jad\DJB

Encs.

cc: Rick Sisk, Unocal Corporation



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KEI-P89-0703.P2
October 23, 1989

PROPOSAL TO
UNOCAL CORPORATION
for the
Unocal Service Station #3538
411 W. MacArthur Blvd.
Oakland, California

GROUND WATER MONITORING, SAMPLING AND ANALYSIS

INTRODUCTION

Preliminary investigation of the ground water conducted in September, 1989 at the referenced site showed the presence of detectable levels of hydrocarbons in the monitoring wells. Per our recommendations described in KEI's report KEI-P89-0703.R5 dated October 23, 1989, Kaprealian Engineering, Inc. (KEI) proposes the following work plan.

PROPOSED TASK

1. Monitor all existing wells (MW1 through MW4) on a monthly basis. Record the elevation of the water table and any abnormal conditions noted during inspection, including presence of product and sheen.
2. Purge and sample ground water from all monitoring wells on a quarterly basis, and analyze for total petroleum hydrocarbons (TPH) as gasoline and benzene, toluene, xylenes and ethylbenzene (BTX&E) on a quarterly basis. In addition, ground water from MW1 (adjacent to the waste oil tank), will be analyzed for TPH as diesel, total oil and grease, and 601 constituents. Prior to sampling, water table elevation will be recorded as well as the presence of any free product.
3. Prepare quarterly technical reports summarizing the field activity water sampling and analyses with discussion and recommendations.

The purging of ground water and sampling should continue for 12 months. This proposed monitoring and sampling program should be re-evaluated after each quarter if necessary.

B O R I N G L O G

Project No. KEI-P89-0703	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal, Oakland/MacArthur	Well Head Elevation N/A	Date Drilled 9/7/89
Boring No. MW1	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement Sand and Gravel: fill.
11/17/22		5		Clay, high plasticity, stiff, moist, very dark grayish brown.

32/17/20		10		Gravelly clay with sand, stiff, moist, dark yellowish brown.
				Sand clay, high plasticity, stiff, moist, olive, trace gravel.
			CH	Clay, high plasticity, very stiff, moist, pale olive, with greenish gray stained root holes.

13/17/19		15		Sandy clay, moderate to high plasticity, stiff, moist, olive to light yellowish brown.
10/17/20	▼			
		20	SC	Clayey sand, dense, very moist to wet, yellowish brown.

B O R I N G L O G

Project No. KEI-P89-0703	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal, Oakland/MacArthur	Well Head Elevation N/A	Date Drilled 9/7/89
Boring No. MW1	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetra- tion blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
			SC	Clayey sand, as above.
		25	SP	Poorly graded sand, yellowish brown.
			CH	Clay, high plasticity, very stiff, moist, yellowish brown.
		30		
		35		
		40		
				TOTAL DEPTH 29'

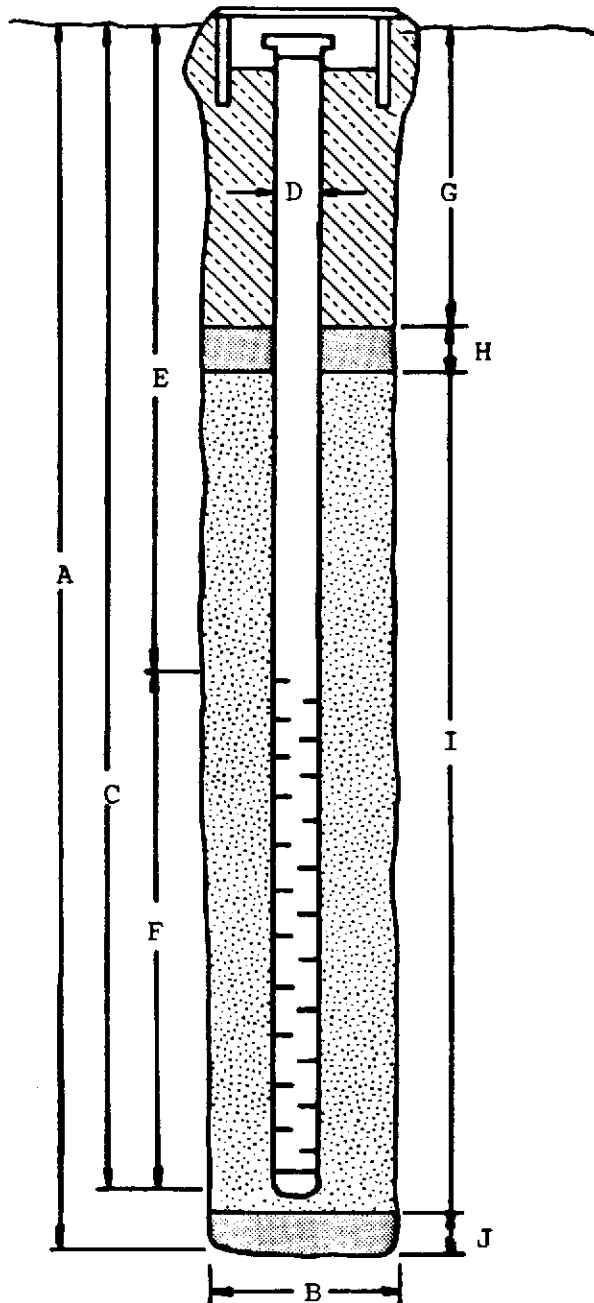
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland, MacArthur BORING/WELL NO. MW1

PROJECT NUMBER: KEI-P89-0703

WELL PERMIT NO.: _____

Flush-mounted Well Cover



A. Total Depth: 29'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem

Auger

C. Casing Length: 29'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 24'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 25'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

B O R I N G L O G

Project No. KEI-P89-0703	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal, Oakland/MacArthur	Well Head Elevation N/A	Date Drilled 9/6/89
Boring No. MW2	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetra- tion blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		Concrete Pavement Sand and Gravel: Fill
9/14/21		5	CH	Clay, high plasticity, with silt, firm to stiff, moist, dark olive gray, black from 1.5 to 4 feet.
13/15/28		10	GC	Clayey gravel with sand, dense, moist, yellowish brown, gravel to 3/4".
9/15/19			CH	Sandy clay, high plasticity, 15-45% sand, stiff, moist, light yellowish brown and greenish gray, mottled, lensed with clayey sand.
10/15/23			SC	Clayey sand, dense to very dense, moist, olive and greenish gray.
8/10/15		15		
9/12/16			CH	Silty clay, moderate to high plasticity, firm, moist, olive.
13/37/46	▼	20	SW	Well graded sand with gravel, dense, wet, brown, silty from 19.5 feet.

B O R I N G L O G

Project No. KEI-P89-0703		Boring & Casing Diameter 9" 2"		Logged By D.L.
Project Name Unocal, Oakland/MacArthur		Well Head Elevation N/A		Date Drilled 9/6/89
Boring No. MW2		Drilling Method	Hollow-stem Auger	Drilling Company EGI
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
25/37/45		25	GP- GM	Poorly graded gravel with silt and sand, very dense, wet, dark yellowish brown.
25/29/35		30	GP	Poorly graded gravel with sand, very dense, wet, dark, yellowish brown.
		30	CH	Clay, high plasticity, trace sand, very stiff, moist, yellowish brown.
		35		
		40		
				TOTAL DEPTH 30.5'

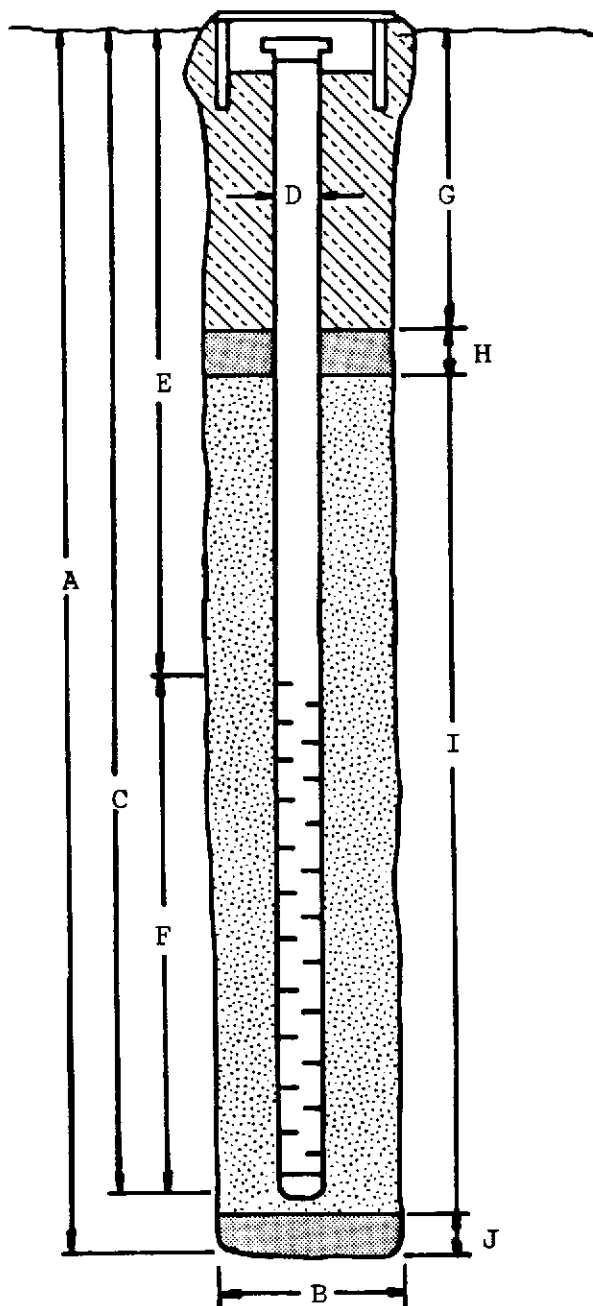
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland, MacArthur BORING/WELL NO. MW2

PROJECT NUMBER: KEI-P89-0703

WELL PERMIT NO.: _____

Flush-mounted Well Cover



A. Total Depth: 30'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem
Auger

C. Casing Length: 28.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 3.5'

F. Perforated Length: 25'

Perforation Type: Machined
Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 27'

Pack Material: RMC Lonestar
Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

B O R I N G L O G

Project No. KEI-P89-0703	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal, Oakland/MacArthur	Well Head Elevation N/A	Date Drilled 9/7/89
Boring No. MW3	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		Concrete Pavement
9/15/21		5	CH	Clay, high plasticity, with silt, stiff, moist, dark olive gray, very dark grayish brown above 4'.
14/17/23		10		Clay, high plasticity, very stiff, moist, pale olive, with dark greenish gray stained root holes.
15/23/33		15	CL	Sandy clay, low to moderate plasticity, 25-40% sand, stiff, moist, olive and greenish gray, mottled, lensed with clayey sand.
10/17/24	▼	20	CH	Sandy clay, moderate to high plasticity, stiff, moist, olive.

B O R I N G L O G

Project No. KEI-P89-0703	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal, Oakland/MacArthur	Well Head Elevation N/A	Date Drilled 9/7/89
Boring No. MW3	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
				Sandy clay, as above.
37/50- 5-1/2"			GP- GC	Poorly graded gravel with clay and sand, very dense, wet, dark yellowish brown.
		25	GC	Clayey gravel, very dense, moist, yellowish brown.
		30		
		35		
		40		
				TOTAL DEPTH 29'

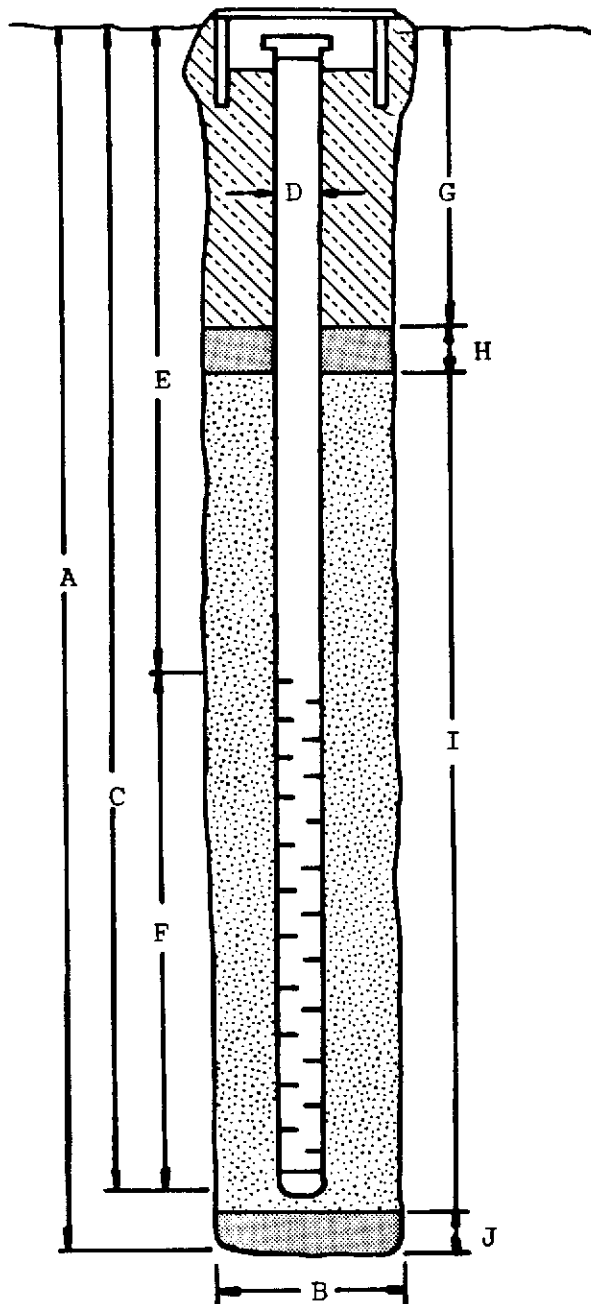
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland, MacArthur BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P89-0703

WELL PERMIT NO.: _____

Flush-mounted Well Cover



A. Total Depth: 29'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 29'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"
ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 24'

Perforation Type: Machined Slot
Perforation Size: 0.020"

G. Surface Seal: 3'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 25'

Pack Material: RMC Lonestar Sand
Size: #3

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

B O R I N G L O G

Project No. KEI-P89-0703		Boring & Casing Diameter 9" 2"		Logged By D.L.
Project Name Unocal, Oakland/MacArthur		Well Head Elevation N/A		Date Drilled 9/6/89
Boring No. MW4		Drilling Method	Hollow-stem Auger	Drilling Company EGI
Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement Sand and Gravel: Fill
12/16/25		5		Clay, high plasticity, very stiff, moist, very dark grayish brown, brown below 5'.
19/25/30		10	CH	Gravelly clay with sand, very stiff, moist, dark yellowish brown.
14/17/29		15		Clay, high plasticity, very stiff, slightly moist, light yellowish brown.
15/15/23	▼		SM	Silty clay, high plasticity, 10-15% fine sand, very stiff, moist, pale olive.
			SW	Silty sand, dense to very dense, very moist to wet, light yellowish brown.
		20		Well graded sand, trace to 10%

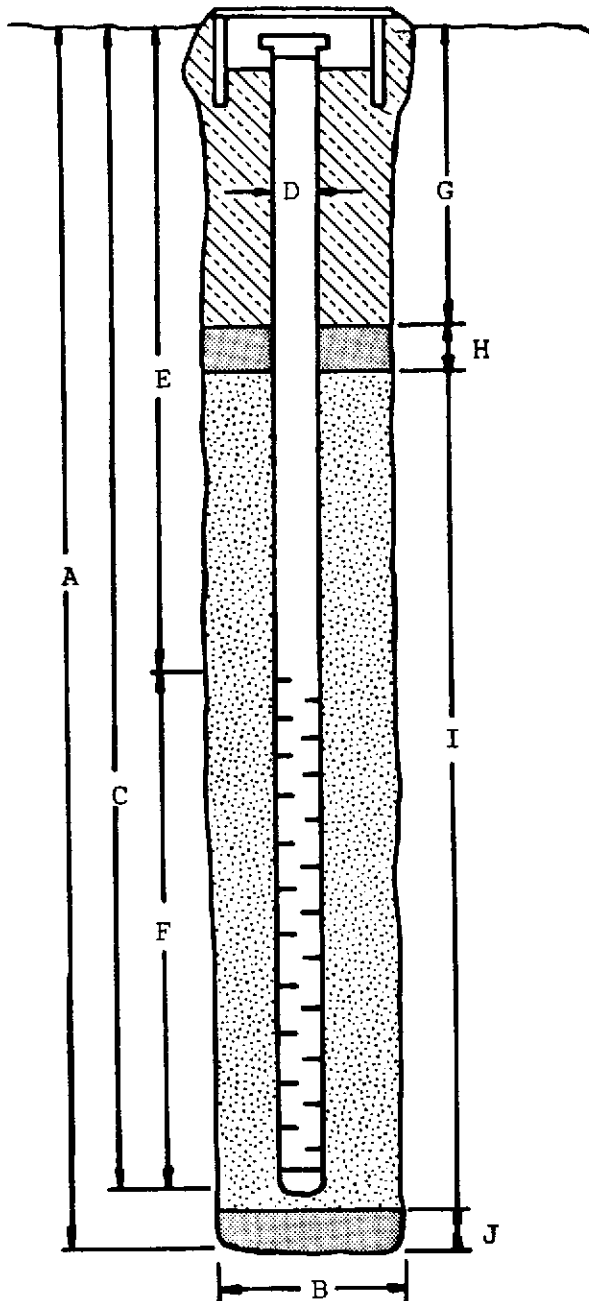
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland, MacArthur BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P89-0703

WELL PERMIT NO.: _____

Flush-mounted Well Cover



- A. Total Depth: 29'
- B. Boring Diameter*: 9"
- Drilling Method: Hollow Stem Auger
- C. Casing Length: 29'
- Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 24'
- Perforation Type: Machined Slot
- Perforation Size: 0.020"
- G. Surface Seal: 3'
- Seal Material: Concrete
- H. Seal: 1'
- Seal Material: Bentonite
- I. Gravel Pack: 25'
- Pack Material: RMC Lonestar Sand
- Size: #3
- J. Bottom Seal: None
- Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

B O R I N G L O G

Project No. KEI-P89-0703		Boring & Casing Diameter 9" 2"		Logged By D.L.
Project Name Unocal, Oakland/MacArthur		Well Head Elevation N/A		Date Drilled 9/6/89
Boring No. MW4		Drilling Method	Hollow-stem Auger	Drilling Company EGI
Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
			SW	finest, dense, wet, dark yellowish brown.
		25	GP-GC	Poorly graded gravel with clay and sand, dense, wet, dark yellowish brown, clay content, increasing with depth.
		30	CH	Gravelly clay, high plasticity, 5-10% sand, very stiff, moist, dark yellowish brown.
		35		
		40		
				TOTAL DEPTH 29'